

What is Claimed:

1. A treatment line process comprising treating a workpiece by one or more chemical and/or physical processes, having one or more variable  
5 parameters and one or more constants, said constants defining an outcome of the treatment upon the workpiece and having set values with limits defining a desired outcome of the treatment, said process further comprising the steps of:
  - 10 a) establishing a correlation or set of correlations between one or more of the variable parameters of the chemical and/or physical processes of the treatment line and one or more constants that define the outcome of the treatment, deriving rules that define the correlation or correlations between the one or more constants and the one or more variable parameters, and storing the correlation or correlations and/or  
15 the rules derived from them in a control system for the treatment line;
  - b) continuously or intermittently measuring the one or more constants that define the outcome of the treatment;
  - 20 c) where one or more of the measured constants approach or deviate from the limits of their respective set values, choosing one or more of the variable parameters most closely correlated with the one or more of the measured constants approaching or deviating from the limits of their respective set values and whose alteration will have no negative  
25 effect on the remaining measured constants, and altering the one or more of the chosen variable parameters in accordance with the correlations established and/or the rules derived in step a) to return or maintain the one or more of the measured constants that are approaching or deviating from the limits of their respective set values  
30 to or within the limits of their respective set values, wherein the altering

of the one or more variable parameters take place automatically without human intervention or wherein the control system for the process issues a recommendation to alter the one or more variable parameters, and

- 5 d) where the measures in c) fail to counteract the deviation of the one or more of the measured constants from the limits of their respective set values, altering one or more of the correlations established and/or the rules derived in step a) to return or maintain the one or more of the measured constants that are approaching or deviating from the limits
- 10 of their respective set values to or within the limits of their respective set values, wherein the altering of the one or more correlations and/or rules take place automatically without human intervention or wherein the control system for the process issues a recommendation to alter the one or more correlations and/or rules.

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2. The process of claim 1, wherein the rules derived from the correlation or correlations between the one or more variable parameters of the chemical and/or physical processes of the treatment line and the one or more constants defining the outcome of the treatment are expressed in the form of
- 20 mathematical equations, as imprecise relations, or in model-free algorithms..

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3. The process of claim 1, wherein the treatment of the workpiece comprises a chemical modification and/or a coating of the surface of the workpiece.

4. The process of claims 1 wherein the treatment line is a phosphating line for the phosphating of metal surfaces before painting.

5. The process of claim 4 wherein the phosphating line comprises one or more phosphating zones and one or more of a cleaning zone, an activation zone, or a post-passivation zone.
- 5 6. The process of claim 5, wherein layer-forming phosphating is carried out in the phosphating zone by contacting the metal surface with an acidic aqueous phosphating solution containing 0.3 to 3 g/l zinc ions and 3 to 30 g/l phosphate ions.
- 10 7. The process of claim 6, wherein the variable parameter or parameters comprise one or more of phosphating solution temperature, zinc concentration in the phosphating solution, pH of the phosphating solution, free acid content of the phosphating solution, total acid content of the phosphating solution, concentration of one or more accelerators in the phosphating solution, concentration of polyvalent metal ions other than zinc in the phosphating solution, contact time between the metal surface and the phosphating solution, and movement of the phosphating solution relative to the metal surface.
- 15 8. The process of claim 5, wherein the variable parameter or parameters are selected from temperature and/or composition of one or more cleaning baths before the phosphating zone, of an activation bath before the phosphating zone and/or of a post-passivation bath after the phosphating zone and/or from contact time between any of these baths and the metal surface.
- 20 9. The process of claim 5, wherein the one or more constants defining the outcome of the treatment comprise one or more of the layer weight of the phosphate layer, the chemical composition of the phosphate layer, the current flow through the phosphate layer during cathodic polarisation, the
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thickness of an electrophoretic coating applied after phosphating, the adhesion of a paint applied after phosphating, the surface structure of a paint applied after phosphating, and the susceptibility of the workpiece to corrosion after phosphating and painting.

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10. The process of claim 1, wherein the measuring of the one or more constants in step b) and/or the altering in step c) or d) of one or more variable parameters and/or the correlations established and/or the rules derived in step a) are recorded on a data carrier.

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11. The process of claim 1, wherein the limits of the set values of the parameters may be varied or reset automatically during the process locally or from a remote location.